

ENGINEERS NORTHWEST, INC. P.S.

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LETTER OF TRANSMITTAL

TO: MG2 Architecture
1101 Second Ave, Ste 100
Seattle, WA 98101

DATE: December 5, 2020

JOB NO: 16038004

ATTENTION: Travis Morton

RE: Costco Headquarters- Building 5

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via COURIER the following items:

☒ Shop drawings

☐ Prints

☐ Plans

☐ Samples

☐ Specifications

☐ Copy of letter

☐ Change order

☐ _____

COPIES	DATE	NO.	DESCRIPTION
E	12/01/20		Fuel Oil Piping Seismic Shop Drawings

THESE ARE TRANSMITTED as checked below:

☐ For approval

☒ Review for Loads Only

☐ Resubmit _____ copies for approval

☒ For your use

☐ Reviewed as noted

☐ Submit _____ copies for distribution

☐ As requested

☐ Returned for corrections

☐ Return _____ corrected prints

☐ For review and comment

☐ REVISE AND RESUBMIT

☐ No Action Taken

☐ PRINTS RETURNED AFTER LOAN TO US

**** If enclosures are not as noted, kindly notify us at once. ****

REMARKS:

COPY TO: FILE

SIGNED: _____

Cesar A. Ruiz

COSTCO ISSAQUAH PARKING GARAGE 5

755 LAKE DRIVE
ISSAQUAH, WA 98027

FUEL OIL PIPING SEISMIC BRACING



POWERED BY:


FORTRESS

Structural Engineering

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SHEET INDEX	
COVER SHEET	COVER
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Since 1948

REVIEWED BY John B.

SUBMITTAL # 231100.04 DATE: 11/30/2020

SUB/SUPPLIER: Holaday-Parks

PROJECT: CCS

☒ REVIEWED

☐ REVIEWED AS NOTED

☐ REVISE & RESUBMIT

FERGUSON CONSTRUCTION'S REVIEW OF THESE DOCUMENTS DOES NOT RELIEVE SUBSUPPLIER OF ITS RESPONSIBILITY FOR:

1) FIELD VERIFICATION OF ALL DIMENSIONS AND JOB-SITE CONDITIONS AND REQUIREMENTS

2) COMPLIANCE WITH CONTRACT DOCUMENTS AND ALL APPLICABLE STATE AND CITY ORDINANCES AND REQUIREMENTS

3) COORDINATION WITH ALL TRADES

RUSHING

Project Name: Costco US Home Office Corp Campus Building 5 - Parking Garage

Date: 2020-12-21

☐ No Exception Taken

☒ Revise as Noted

☐ Exception Taken, Revise and Resubmit

RUSHING GENERAL COMMENTS:

1. REVISE AS NOTED ON ATTACHED SHEETS FOR GENERATOR SYSTEM IP=1.5.

2. ADDITIONALLY, THIS IS A DESIGNATED SEISMIC RESTRAINT SYSTEM THAT SHALL BE DESIGNED PER THE MECHANICAL DRAWINGS FOR POST SEISMIC EVENT OPERATION.

ENGINEERS NORTHWEST, INC. is not responsible for this design or performance of this product.

ENGINEERS NORTHWEST, INC. has reviewed the applied loads only for conformance to the construction documents and has reviewed absolutely nothing else

12-08-2022 CAR

Date By

REV:	DATE:	ISSUED FOR:
	11/20/20	SUBMITTAL



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San Jose, California
Los Angeles, California

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COVER SHEET
FUEL OIL PIPING SEISMIC BRACING
COSTCO ISSAQUAH - BUILDING 5 GARAGE
755 LAKE DRIVE
ISSAQUAH, WA 98027

PROJECT: 20222
DRAWN BY: JM
CHECKED BY: MO
SCALE: NO SCALE

SHEET
COVER

C:\O\Fortress\Projects\2022 COSTCO Fuel oil seismic 30x42.dwg

GENERAL SEISMIC BRACING NOTES

PLBG/MECH PIPING

1. VERIFY ALL DIMENSIONS AND FIELD CONDITIONS BEFORE STARTING WORK. IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
2. WHERE NO DETAILS ARE SHOWN OR NOTED, DETAILS SHALL BE THE SAME AS SHOWN IN OTHER DETAILS.
3. SEISMIC BRACING HAS BEEN DESIGNED FOR SEISMIC LOADS ONLY. PROTECT HANGERS OR RACKS FROM ANY OTHER LOADS APPLIED DURING CONSTRUCTION AND OPERATION BY BRACING, BALANCING, ETC.
4. DESIGN OF PIPING, CONDUIT SYSTEMS, MECHANICAL SYSTEMS, SEISMIC JOINTS, ANCHORS AND OTHER SYSTEMS ARE BY OTHERS. OTHERS TO VERIFY ANY CONFLICTS BETWEEN SEISMIC BRACING AND SYSTEM OPERATION.
5. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE APPLIED LOADS.
6. SEISMIC BRACING SHALL BE INSTALLED AS SHOWN.
7. ALL WORK SHALL CONFORM TO CONTRACT PLANS, SPECIFICATIONS, CALIFORNIA BUILDING CODE/INTERNATIONAL BUILDING CODE, SMACNA, AND OTHER LOCAL, STATE AND FEDERAL REGULATIONS.
8. PER ASCE7-10 SECTION 13.6.8.3, BRACING IS NOT REQUIRED FOR PIPING THAT IS SUPPORTED 12" OR LESS FROM TOP OF PIPING OR TRAPEZE SUPPORT POINT TO THE SUPPORT STRUCTURE. ROD HANGERS MUST BE EQUIPPED WITH SWIVELS TO PREVENT BENDING IN ROD.
- 10A. PER ASCE 7-10 SECTION 13.6.8.3, IF COMPONENT IMPORTANCE FACTOR $I_p=1.0$ BRACING IS NOT REQUIRED FOR PIPING TRAPEZES WEIGHING EQUAL TO OR LESS THAN 10 LBS/LF AND WITHOUT SINGLE PIPES REQUIRING BRACING. BRACING NOT REQUIRED FOR SINGLE PIPES 3" Ø AND SMALLER OR 5 LBS/LF AND LESS.
- 10B. PER ASCE 7-10 SECTION 13.6.8.3, IF COMPONENT IMPORTANCE FACTOR $I_p=1.5$ BRACING IS NOT REQUIRED FOR PIPING TRAPEZES WEIGHING EQUAL TO OR LESS THAN 10 LBS/LF AND WITHOUT SINGLE PIPES REQUIRING BRACING. BRACING NOT REQUIRED FOR SINGLE PIPES 1" Ø AND SMALLER OR 5 LBS/LF AND LESS.
11. PER CBC 1616A.1.18, BRACING NOT REQUIRED FOR DISTRIBUTION SYSTEMS 5 LB/FT OR LESS WITH FLEXIBLE CONNECTIONS TO COMPONENTS. CONTRACTOR TO PROVIDE FLEXIBLE CONNECTIONS IF BRACING OTHERWISE REQUIRED.
12. IF A TRANSVERSE BRACE FALLS WITHIN 24" OF A WALL PENETRATION (AT FULL HEIGHT WALL UTILITY IS RESTRAINED IN THE TRANSVERSE DIRECTION) THE TRANSVERSE BRACE MAY BE ELIMINATED BY THE ENGINEER.
13. ALL TRANSVERSE BRACES PLACED ON THE RUN SECTION AT THE OPPOSITE SIDE OF AN ELBOW OR TEE PLACED WITHIN 24" OF THE ELBOW OR TEE AND MAY BE CONSIDERED A LONGITUDINAL BRACE BY THE ENGINEER.

SEISMIC BRACING PRODUCTS

1. B-LINE/TOLCO SEISMIC BRACING SYSTEM.
SEISMIC ENGINEERING GUIDELINES (SEG-12)

PROJECT DESIGN DATA
GOVERNING CODE: 2015 INTERNATIONAL BUILDING CODE
SEISMIC DESIGN
SITE CLASS F
SEISMIC DESIGN CATEGORY E
RISK CATEGORY II
$I_p = 1.0$
$I_p = 1.5$ FOR HAZARDOUS/LIFE SAFETY
$S_{ds} = 0.634$
$S_s = 0.951$

GENERAL ANCHORAGE NOTES

POST-INSTALLED ANCHORS

1. FOR ESSENTIAL FACILITIES, 50 PERCENT OF THE EXPANSION TYPE ANCHORS (ALTERNATE ANCHORS IN ANY GROUP ARRANGEMENT) SHALL BE PROOF TESTED TO TWICE THE ALLOWABLE CAPACITY IN TENSION. IF ANY ANCHOR FAILS, 20 CONSECUTIVE ANCHORS INSTALLED BY THE SAME TRADE MUST THEN ALSO BE TESTED BEFORE RESUMING 50 PERCENT TESTING. TESTING SHOULD OCCUR 24 HOURS MINIMUM AFTER INSTALLATION OF ANCHOR.
2. FOLLOW ALL WEDGE ANCHOR INSTALLATION REQUIREMENTS PER INDIVIDUAL ICC ESR REPORT.
3. MINIMUM CONCRETE THICKNESS SHALL COMPLY WITH INDIVIDUAL ICC ESR REPORT.
4. WHEN INSTALLING ANCHORS IN REINFORCED CONCRETE, AVOID DAMAGING REINFORCING STEEL.
5. WHEN INSTALLING ANCHORS IN PRESTRESSED CONCRETE, LOCATE PRESTRESSING STEEL AND AVOID DAMAGING PRESTRESSING STEEL.
6. STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE FOR THE TABULATED ALLOWABLE LOADS.
7. SPECIAL INSPECTION SHALL BE PROVIDED PER CBC/IBC. THE SPECIAL INSPECTOR MUST BE ON THE JOBSITE CONTINUOUSLY DURING ANCHOR INSTALLATION TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE DIMENSIONS, ANCHOR SPACING, EDGE DISTANCES, SLAB THICKNESS, ANCHOR EMBEDMENT AND TIGHTENING TORQUE.
8. HANGER ROD DIAMETER SHALL BE EQUAL TO OR GREATER THAN THE ANCHOR DIAMETER UNLESS NOTED OTHERWISE.

POST-INSTALLED ANCHORS: ICC ESR REPORTS

1. POWERS/DEWALT POWER-STUD+ SD2 - ICC ESR 2502.

RUSHING:
GENERATOR FUEL OIL PIPING IS A
DESIGNATED SEISMIC SYSTEM DESIGN
FOR POST SEISMIC EVENT OPERATION
AND TO HAVE AN IP=1.5 PER
MECHANICAL DRAWINGS.

REV: DATE:	ISSUED FOR:
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GENERAL NOTES
FUEL OIL PIPING SEISMIC BRACING
COSTCO ISSAQUA - BUILDING 5 GARAGE
755 LAKE DRIVE
ISSAQUAH, WA 98027

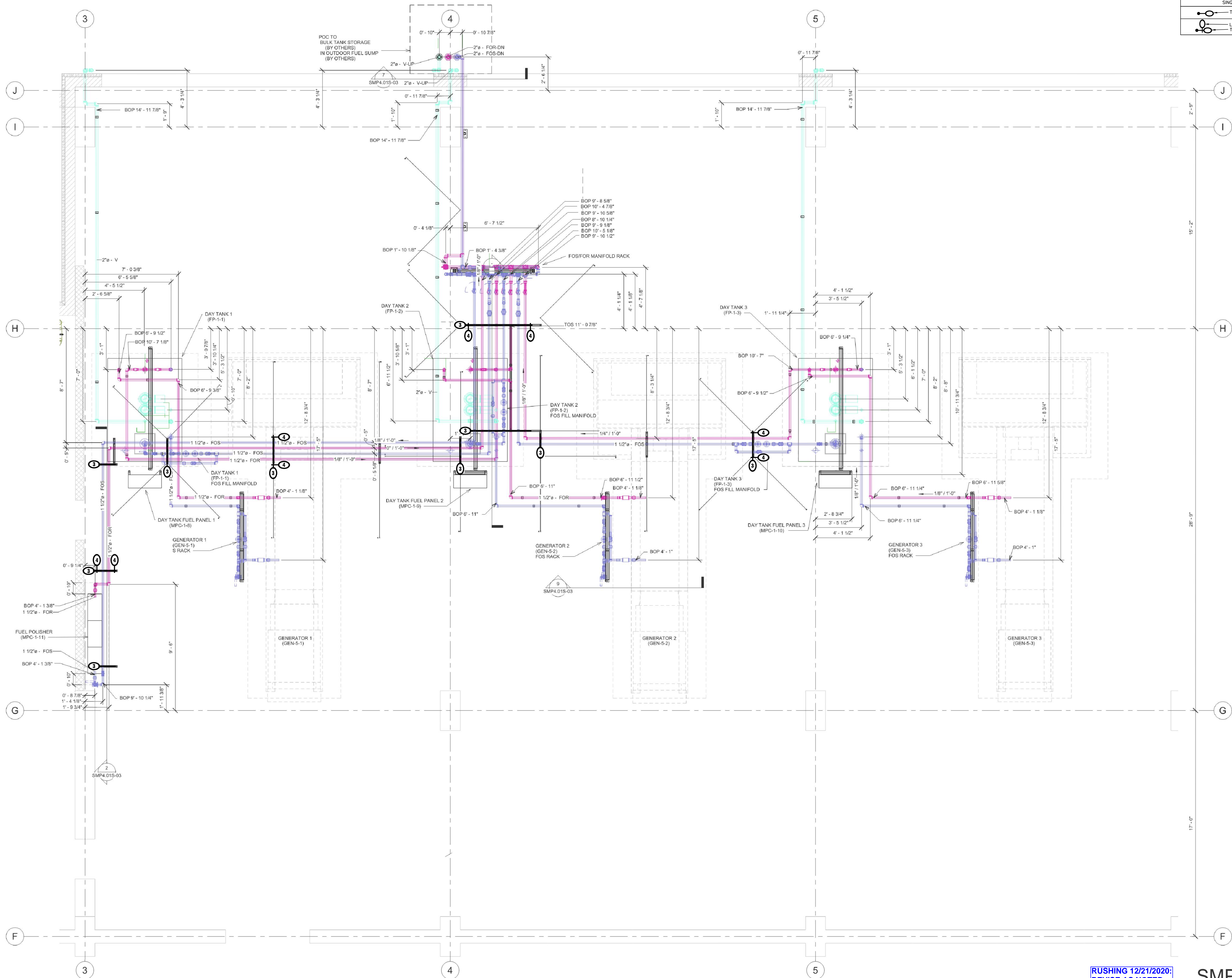
PROJECT:	20222
DRAWN BY:	JM
CHECKED BY:	MO
SCALE:	NO SCALE

SHEET

SB-0

RUSHING 12/21/2020:
REVISE AS NOTED

C:\O\Fortress\Projects\2022\COSTCO\2022_COSTCO_Fuel_08 seismic_SB-1.dwg



SEISMIC BRACING LEGEND	
	BRACING ASSEMBLY DETAIL NUMBER, REFER TO BRACING DETAIL SHEET
SINGLE HUNG SYSTEMS	
	TRANSVERSE BRACING
	LONGITUDINAL BRACING
	TRANSVERSE BRACING

REV: DATE: ISSUED FOR:
11/20/20 SUBMITAL

HOLIDAY PARKS, INC.
SMART Mechanical Solutions



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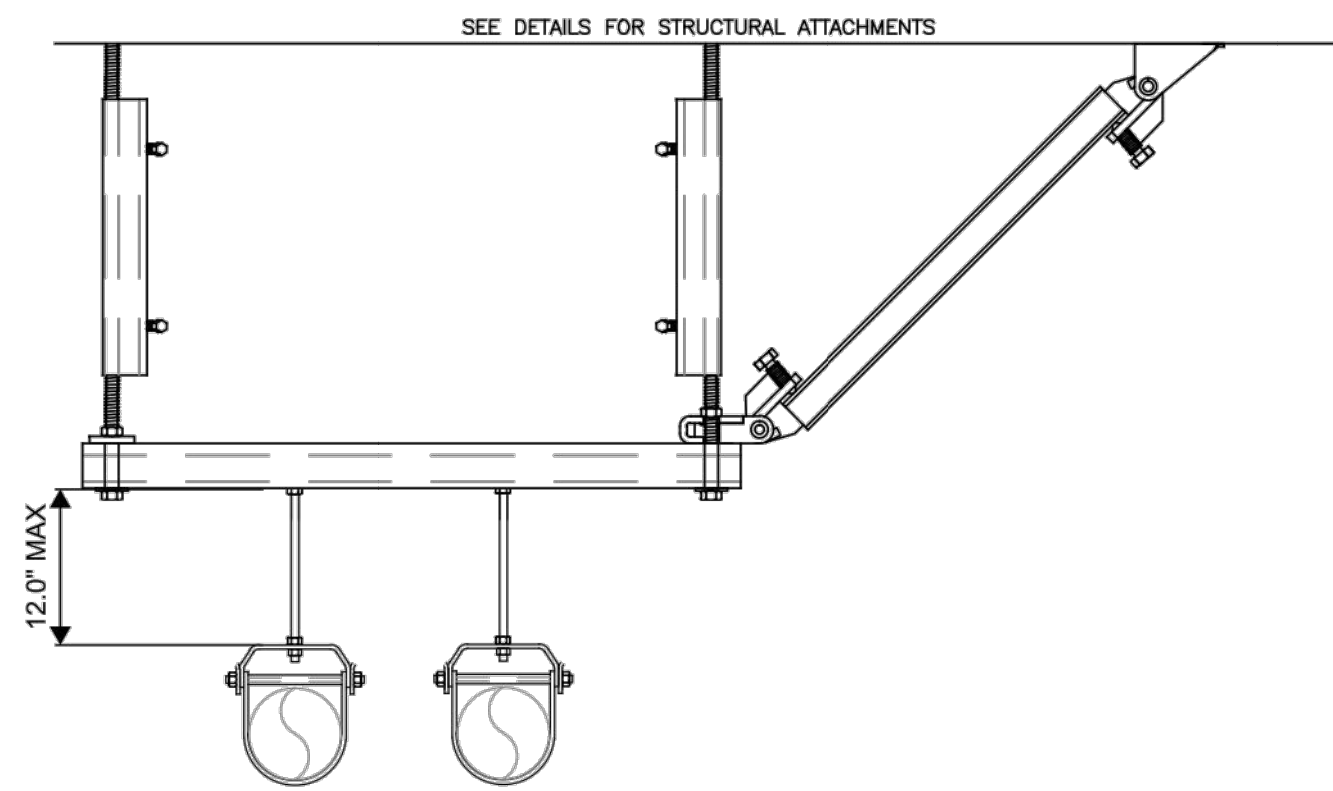
LEVEL 1 PLAN
FUEL OIL PIPING SEISMIC BRACING
COSTCO ISSAQUA - BUILDING 5 GARAGE
755 LAKE DRIVE
ISSAQUAH, WA 98027

PROJECT: 20222
DRAWN BY: JM
CHECKED BY: MO
SCALE: 3/8"=1'-0"

SHEET
SB-1

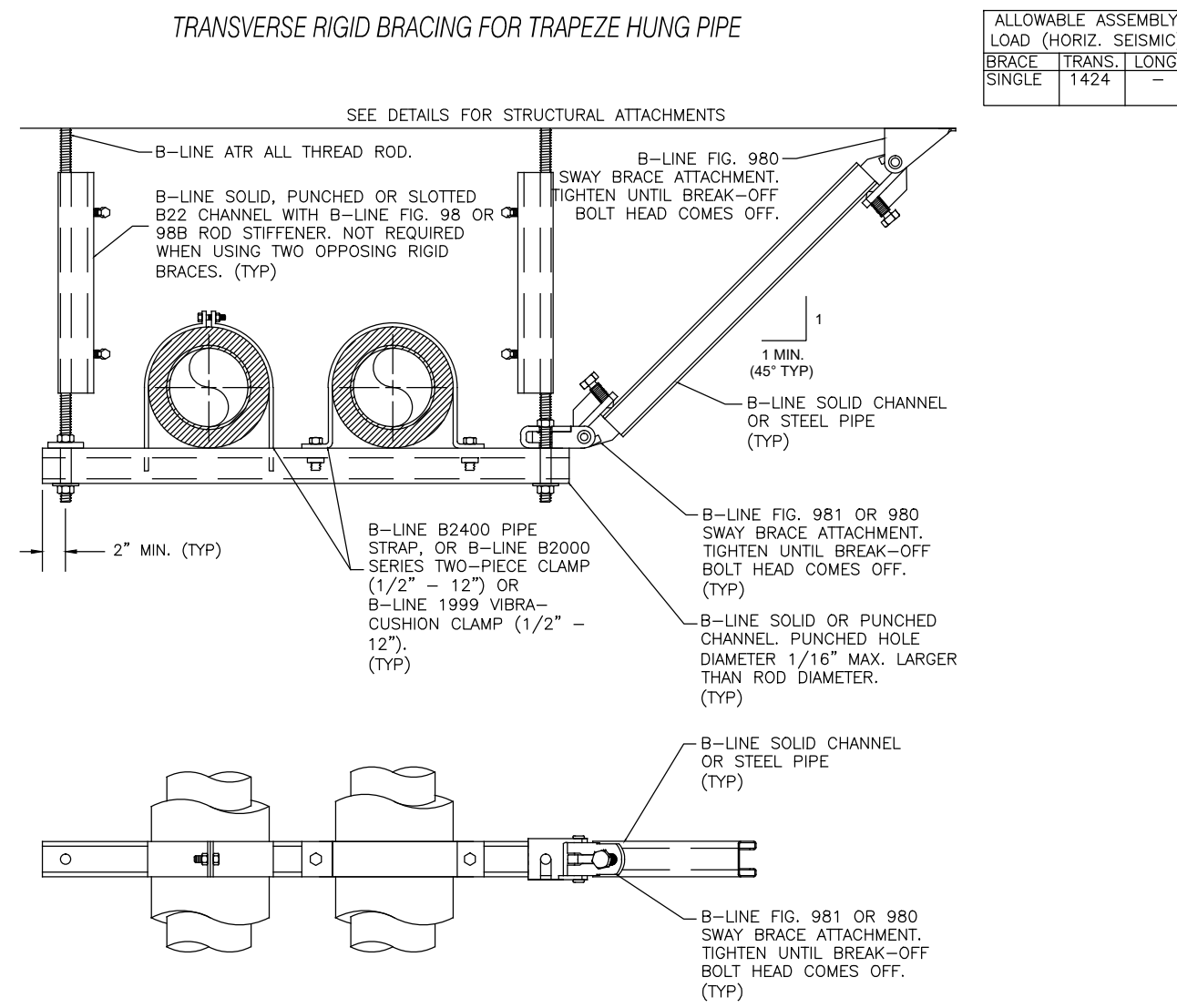
RUSHING 12/21/2020:
REVISE AS NOTED

SMP2.01S-02



FUEL OIL PIPING ASSUMED TO BE LESS THAN 12" FROM SUPPORTED TRAPEZE. NO ADDITIONAL BRACING AT PIPE HANGERS REQUIRED.

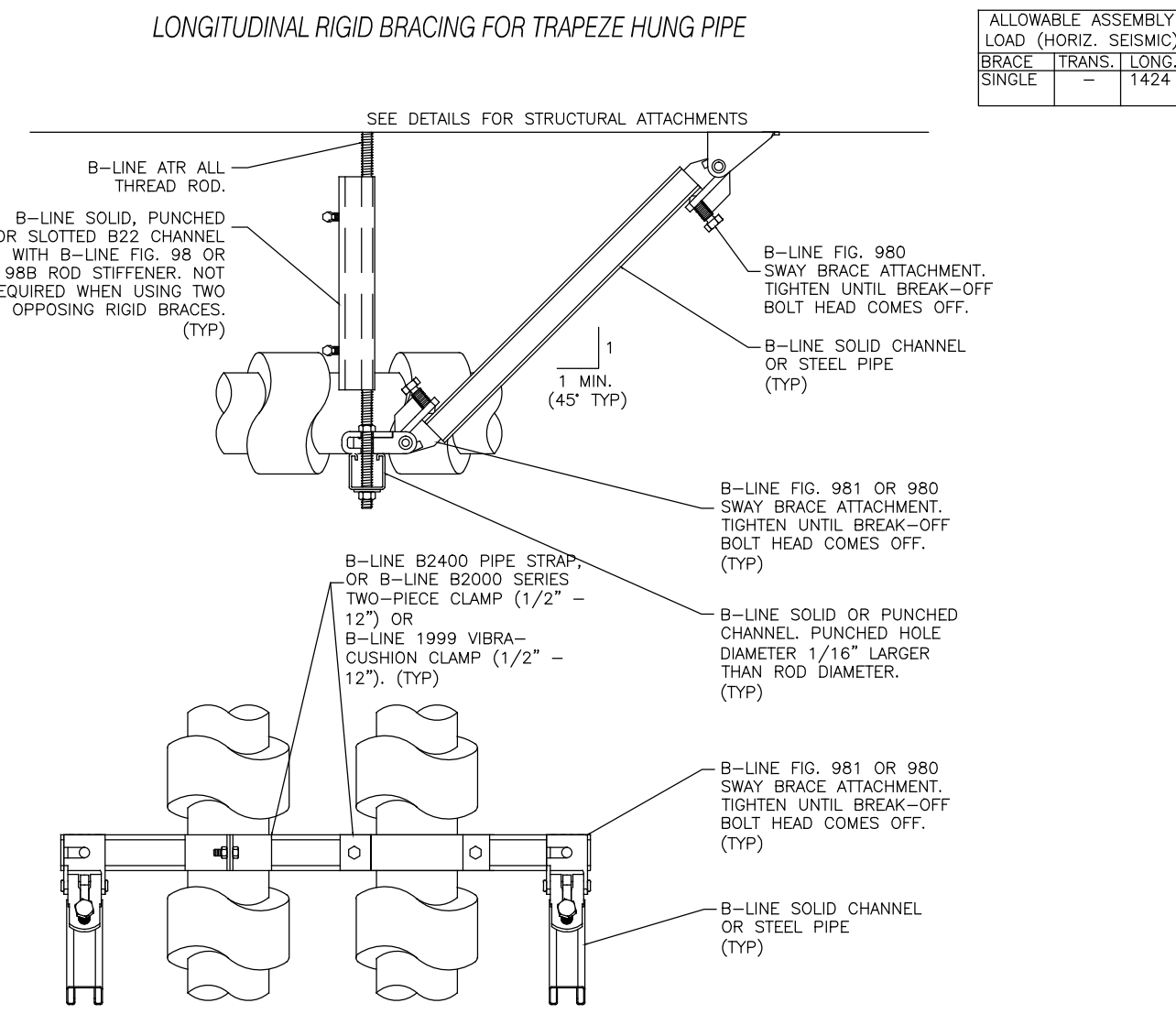
FUEL OIL PIPE INSTALLATION DETAIL - SUSPENDED BELOW TRAPEZE
SCALE: N.T.S



NOTES:
1.) TRANSVERSE BRACES MAY BE INSTALLED IN OPPOSING DIRECTIONS.
2.) STRUT SPACER MAY BE USED BY WELDING STRUT SPACER TO TRAPEZE STRUT WITH 3/16" FILLET WELD, 1" LONG AT 2" O.C., BOTH SIDES.

DETAIL 3
N.T.S.

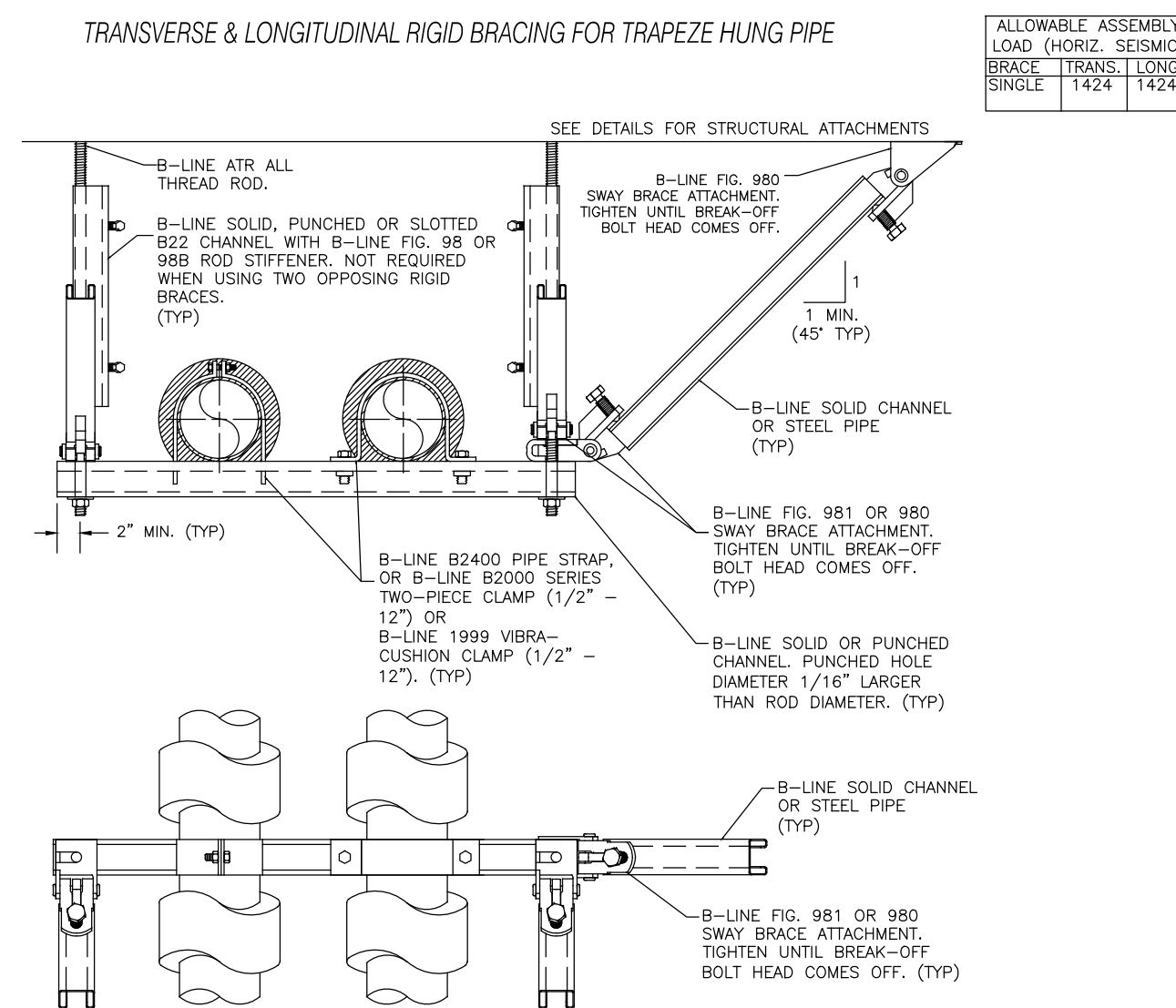
THIS DETAIL IS REFERENCED FROM B-LINE SEISMIC ENGINEERING GUIDELINES (SES-10)



NOTES:
1.) LONGITUDINAL BRACES MAY BE INSTALLED IN OPPOSING DIRECTIONS.
2.) STRUT SPACER MAY BE USED BY WELDING STRUT SPACER TO TRAPEZE STRUT WITH 3/16" FILLET WELD, 1" LONG AT 2" O.C., BOTH SIDES.

DETAIL 4
N.T.S.

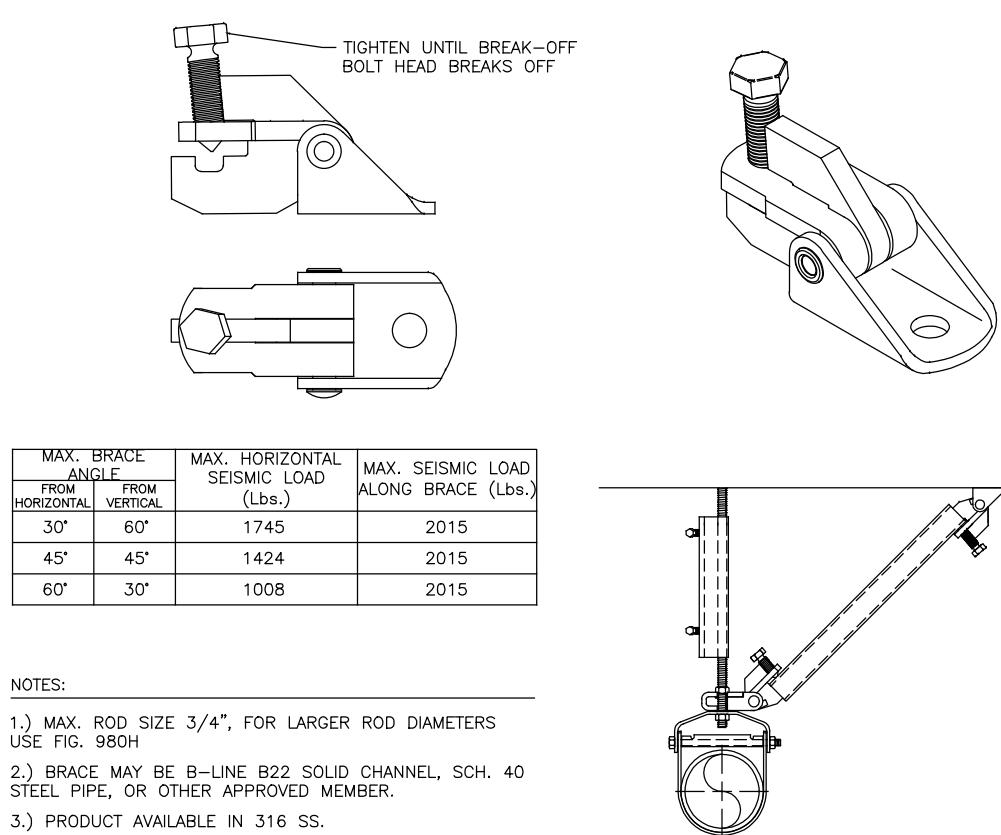
THIS DETAIL IS REFERENCED FROM B-LINE SEISMIC ENGINEERING GUIDELINES (SES-10)



NOTES:
1.) LONGITUDINAL AND TRANSVERSE BRACES MAY BE INSTALLED IN OPPOSING DIRECTIONS.
2.) STRUT SPACER MAY BE USED BY WELDING STRUT SPACER TO TRAPEZE STRUT WITH 3/16" FILLET WELD, 1" LONG AT 2" O.C., BOTH SIDES.

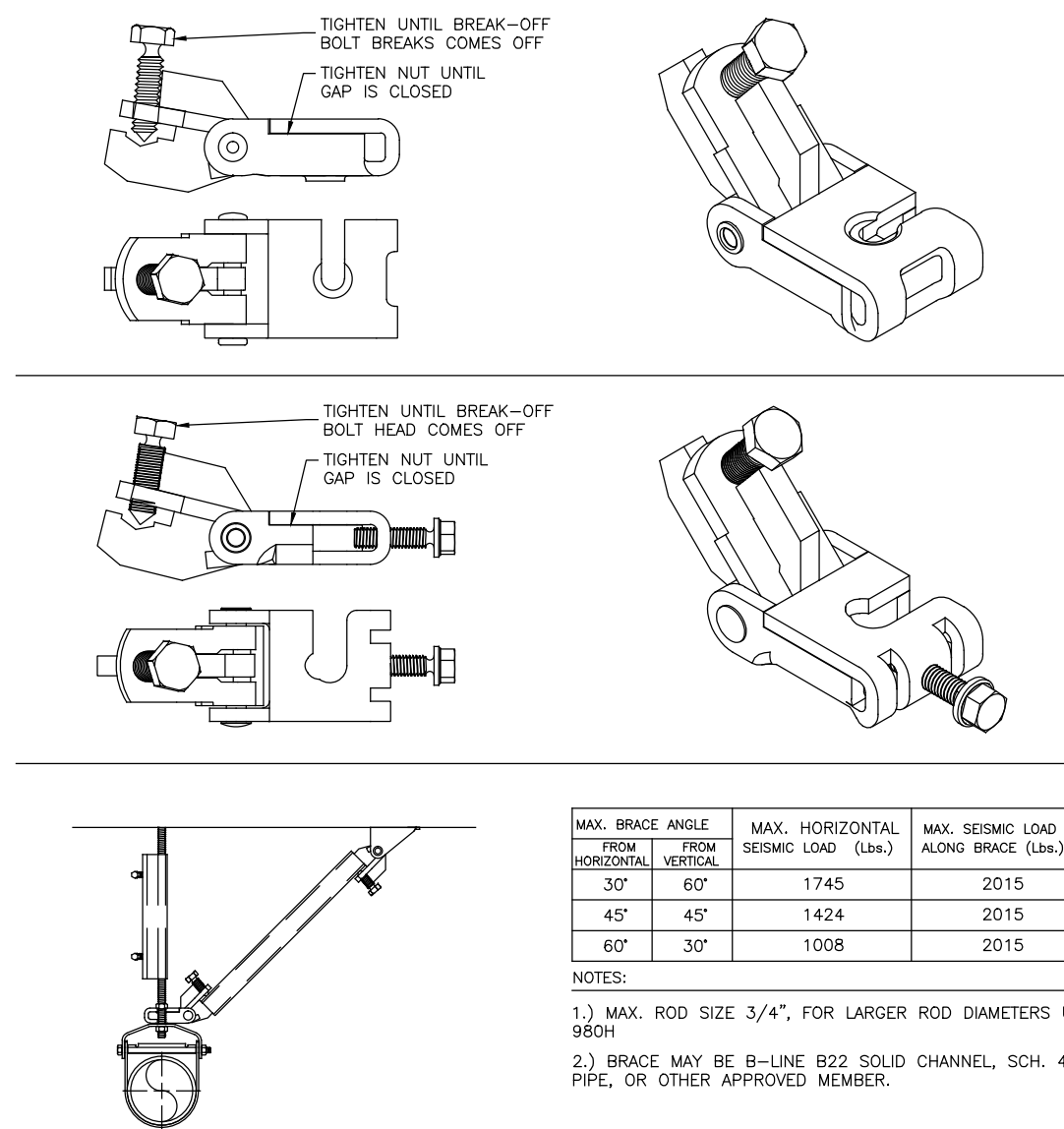
DETAIL 3 & 4 COMBINATION
N.T.S.

THIS DETAIL IS REFERENCED FROM B-LINE SEISMIC ENGINEERING GUIDELINES (SES-10)



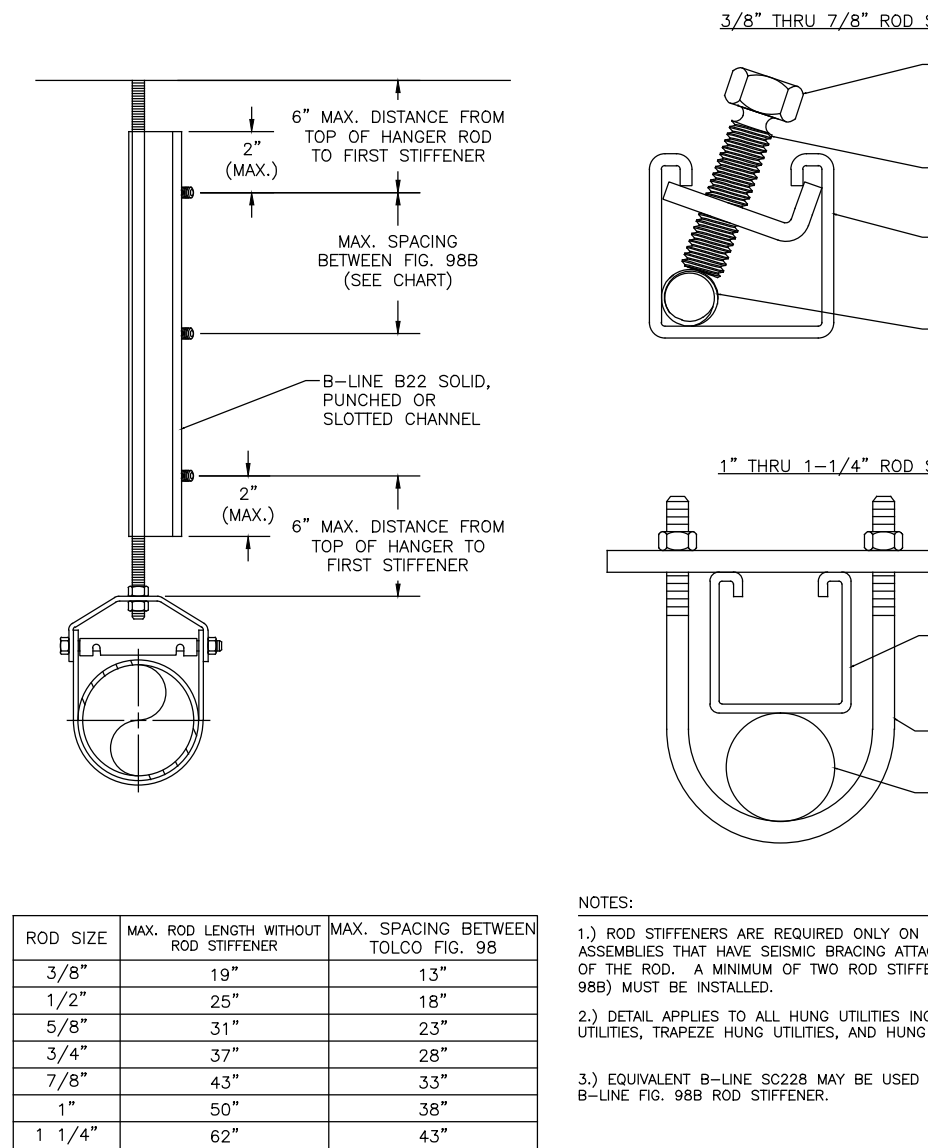
B-LINE DETAIL 12-1
N.T.S.

THIS DETAIL IS REFERENCED FROM B-LINE SEISMIC ENGINEERING GUIDELINES (SES-10)



B-LINE DETAIL 12-2
N.T.S.

THIS DETAIL IS REFERENCED FROM B-LINE SEISMIC ENGINEERING GUIDELINES (SES-10)



B-LINE DETAIL 12-25
N.T.S.

THIS DETAIL IS REFERENCED FROM B-LINE SEISMIC ENGINEERING GUIDELINES (SES-10)

PIPE DIAMETER	MAXIMUM LENGTH	SDS1	ALLOWABLE HORIZ. SEISMIC LOAD W/ BRACE # 49 (LBS.)
1"	7'-0"	40	1732
1 1/4"	8'-0"	40	2200
1 1/2"	10'-4"	40	2802
2"	15'-1"	40	3769
2 1/2"	18'-9"	40	4779
3"	18'-6"	40	5359
3 1/2"	22'-10"	40	5859
4"	25'-9"	40	6353

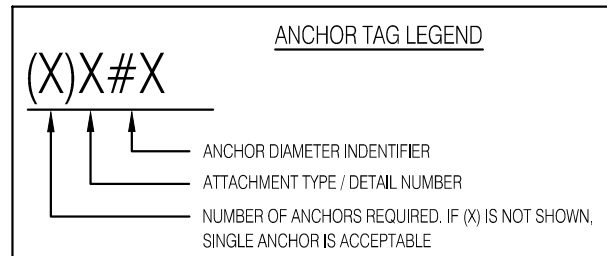
STRUT SIZE (SEE NOTE 4)	MAXIMUM LENGTH	ALLOWABLE HORIZ. SEISMIC LOAD W/ BRACE # 49 (LBS.)
1/2"	0	2043
3/8"	0	609
1/4"	0	1449
1/4"	0	2227

LOADS ARE CONTROLLED BY CABLE BREAKING STRENGTHS.

NOTES:
1.) MAXIMUM ALLOWABLE LENGTHS AND CONCENTRIC LOADS WHEN L/R = 200 (N/A 13) ALLOWS THE USE OF L/R = 100 FOR BRACE MEMBERS.
2.) ALL LONGITUDINAL AND TRANSVERSE BRACING UTILIZING PIPE OR CHANNEL AS THE BRACING MEMBER HAS A TOLERANCE OF 8" FROM CENTER IN EITHER DIRECTION WITHOUT AFFECTING THE ALLOWABLE LOADS.
3.) TABULATED LOADS ARE SUBJECT TO LIMITS GOVERNED BY THE CAPACITY OF THE PRIMARY STRUCTURE, INCLUDING, BUT NOT LIMITED TO, CONCRETE FILL OVER METAL DECK CAPACITY, FOR THE CONTRACT DOCUMENTS.
4.) B-LINE B22 OR B-LINE B24 SOLID CHANNEL.

B-LINE DETAIL 12-25
N.T.S.

THIS DETAIL IS REFERENCED FROM B-LINE SEISMIC ENGINEERING GUIDELINES (SES-10)



Level 1: All supports under 6.5" Min. Concrete PT Slab U.N.O.

Case	Description	Wt (plf)	Max Spacing (ft)	Dual Hanger Brace (T/L)	Braces	Hanger w/ Brace	Anchorage Options	Hanger w/o Brace	Min. ATR	Brace Selection
1.1	(8) 1-1/2" Fuel Oil Pipe Trapeze	36.0	10.0	20/40	No	H1A,H1B,H1C,H1D	B1A,B1B,B1C,B1D	H1A,H1B,H1C,H1D	1/2"	B22 Strut or Pipe Brace
1.2	(4) 1-1/2" Fuel Oil Pipe Trapeze	18.0	10.0	20/40	No	H1A,H1B,H1C,H1D	B1A,B1B,B1C,B1D	H1A,H1B,H1C,H1D	1/2"	B22 Strut or Pipe Brace
1.3	(2) 1-1/2" Fuel Oil Pipe Trapeze	9.0	10.0	20/40	No	H1A,H1B,H1C,H1D	B1A,B1B,B1C,B1D	H1A,H1B,H1C,H1D	1/2"	B22 Strut or Pipe Brace
1.4	(1) 1-1/2" Fuel Oil Pipe Trapeze	4.5	10.0	20/40	No	H1A,H1B,H1C,H1D	B1A,B1B,B1C,B1D	H1A,H1B,H1C,H1D	1/2"	B22 Strut or Pipe Brace

Case 1.1 Controls Cases 1.2, 1.3, & 1.4

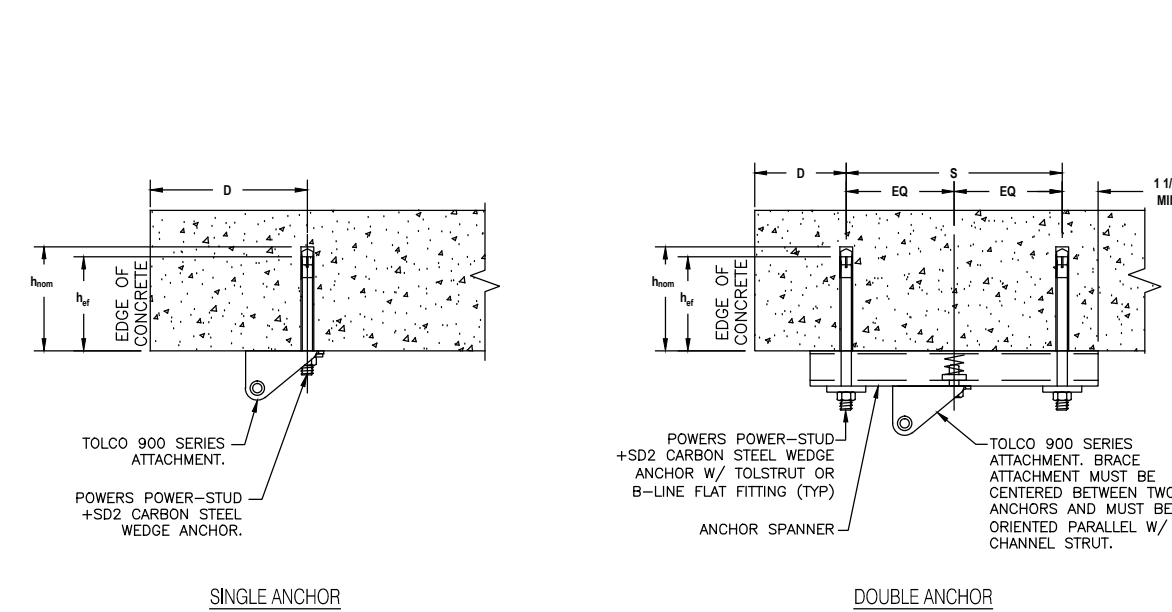
Anchorage Summary

Anchor Tag	Anchor Brand	Anchor Size/Effective Embed
H1A	Powers SD2 - Concrete Slab	3/8x2"
B1A	Powers SD2 - Concrete Slab	1/2x2"
H1B	Powers SD2 - Concrete Slab	1/2x3.25"
B1B	Powers SD2 - Concrete Slab	1/2x3.25"
H1C	Powers SD2 - Concrete Slab	1/2x3.25"
B1C	Powers SD2 - Concrete Slab	1/2x3.25"
H1D	Powers SD2 - Concrete Slab	5/8x4.25"
B1D	Powers SD2 - Concrete Slab	5/8x4.25"

NOTES:
1. SPACING OF HANGERS AND BRACES LISTED IN TABLE IS TRIBUTARY SPACING AND DOES NOT DENOTE THE EXACT O.C. DISTANCE BETWEEN THESE COMPONENTS.
2. BRACE SPACING COLUMN INDICATES SPACING AS TRANSVERSE/LONGITUDINAL OR (T/L).

BRACE SPACING AND ANCHOR SELECTION TABLE

POWERS POWERSTUD + SD2 WEDGE ANCHOR - CONCRETE SLAB



ANCHOR SPACER

DOUBLE ANCHOR

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